

Measuring, Managing and Messaging: The Challenges of Data and Decision Making

Steven Schultz
Corporate Energy Manager
3M

Presented at the
Pew Center on Global Climate Change
Energy Efficiency Conference
April 7, 2010
Chicago, IL



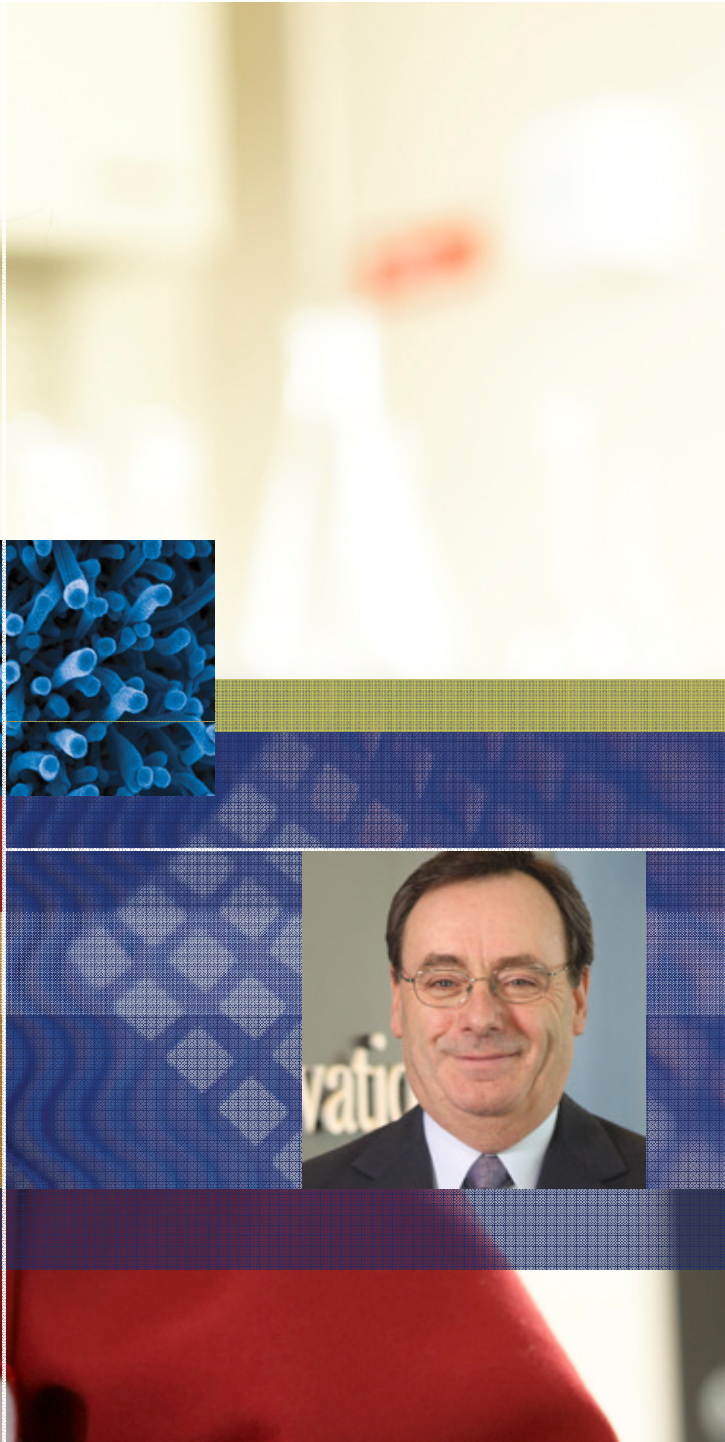
Solving Problems Everywhere

- Operate companies in more than 65 countries
 - 35 international companies with manufacturing operations, 35 with laboratories
 - In the United States, operations in 28 states
- R&D and related expenditures total \$6.861 billion for the last five years
- More than 75,000 employees worldwide
- We provide 'borderless customer success'



Six Market-Leading Businesses





Leading Through
Innovation

S. LAB

Environmental Results Worldwide

Our progress toward sustainability

- Prevented the generation of 2.9 billion pounds of pollutants since 1975 with more than 7,400 3P projects.
- Cut volatile organic air emissions 95%.
- In 2010 again, received the ENERGY STAR Sustained Excellence Award for Energy Management.
- 3M reduced absolute greenhouse gas emissions by 69% from 1990-2008.





Making Energy Efficiency

A Competitive Advantage



3M Energy Management

- 3M began its Energy Management Program in 1973
 - 37 years of continuous improvement
- 3M U.S. operations used only 4% more energy in 2009 than in 1973 while U.S. net sales increased nearly 3x.
- Worldwide, 3M's operations have reduced their energy use by more than 40% since 2000 (based on total Btu's used per dollar of net sales).
- Our total energy use in 2009 was 22% less than in 2000
- Greenhouse gas emissions have been reduced significantly.



Corporate Energy Goals

2005 - 2010

Target: Reduce energy usage by 20% based on Btu's per unit of product

Scope: All divisions, all countries

Process:

- **Top-down** consistent company-wide target
- Businesses develop prioritized plans for projects & spend and measured by results
- Facilities report data quarterly

Future (being finalized)

Target: 25% improvement in energy utilization

Rationale: Consistent with U.S. Department of Energy Save Energy Now Leaders pledge

Process:

- **Top-down** consistent company-wide target

Corporate Energy Goals

2005 - 2010

Target: Reduce energy usage by 20% based on Btu's per unit of product

Scope: All divisions/countries

Process:

- **Top-down** consistent company-wide target
- Businesses develop prioritized plans for projects & spend and measured by results
- Facilities report data quarterly

Future (being finalized)

Target: 25% improvement in energy utilization

Rationale: Consistent with U.S. Department of Energy Save Energy Now Leaders pledge

Process:

- **Top-down** consistent company-wide target


Objectives

1. Encourage businesses to think in terms of energy strategically
2. Encourage facilities to continue to drive site-specific reductions


Scope and Structure

- Over 200 world-wide locations engaged in program
- Energy teams at each of 56 larger locations
- Each measured on Efficiency, Team, and Projects
- Business units support teams through annual plans
- Corporate Energy Management provides resources including quarterly progress reports
 - Guidelines for energy teams
 - Best Practice sharing
 - Monthly web conferences
 - Access to experts
 - Assessments
 - Awards and Recognition

Site Specific Goals (annual)

- 
- 4% reduction in energy use per pound of product produced (or square foot of space if a non production facility)
 - Implement projects representing savings of 4% of 2009 energy spend
 - Score 85% or greater on Plant Energy Program Effectiveness Rating

Track Progress

- 
- Site Energy Data System
 - Tracks energy use and cost information for each 3M site world-wide
 - Production inputs from corporate Environmental Targets database
 - Energy Cost Reduction Projects database
 - Tracks energy projects being implemented at each 3M location
 - Plant Energy Program Effectiveness Rating
 - Standardized methodology to measure team effectiveness

July 20, 2009

3M Plant Dashboard

Energy Trend

Btu/Pound of Product

Change¹

Energy Use (MM Btu)

Change

Energy Cost

Change

Energy Cost per MM Btu

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
23,843	18,761	17,845	18,255	19,617	18,833	18,838	16,593	17,859	21,271	18,510
					-4%	-20.99%	-11.56%	0.08%	16.52%	-5.64%
141,960	114,554	104,194	128,370	489,079	469,515	147,804	120,083	112,512	118,650	499,049
						4.12%	4.83%	7.98%	-7.57%	2.04%
\$1,792,949	\$1,559,032	\$1,441,025	\$1,732,413	\$6,525,420	\$6,264,403	\$1,985,083	\$2,164,435	\$1,996,674	\$1,397,109	\$7,543,300
						10.72%	38.83%	38.56%	-19.35%	15.60%
\$12.63	\$13.61	\$13.83	\$13.50	\$13.34		\$13.43	\$18.02	\$17.75	\$11.78	\$15.12

World Class Rating

Plant Energy Program Effectiveness Rating²

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
90%	90%	90%	90%	90%	85%	87%	87%	92%	92%	92%

Projects

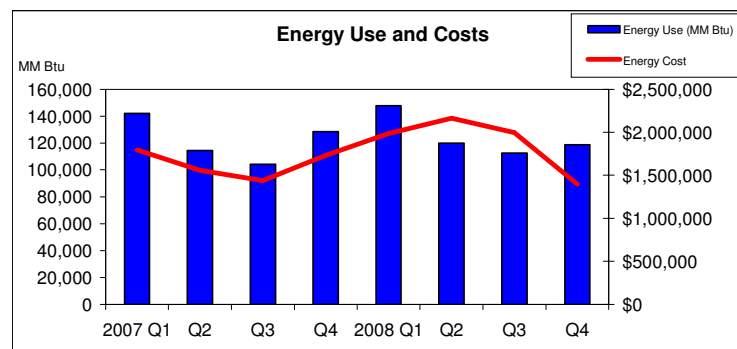
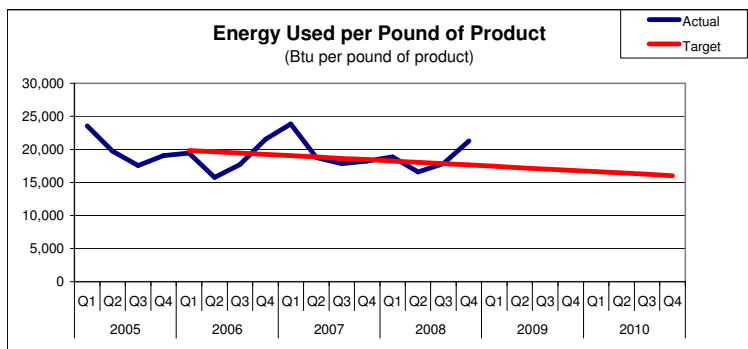
\$ Value of Energy Projects Delivered

\$ Value of Energy Projects Delivered as a %

of Plant Energy Spend³

\$ of Projects Identified, Being Evaluated & Planned

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
\$109,772	\$63,126	\$63,126	\$195,181	\$431,204	\$261,017	\$155,142	\$144,899	\$144,899	\$32,770	\$477,710
6.1%	4.0%	4.4%	11.3%	6.6%	4%	7.8%	6.7%	7.3%	2.3%	7.3%
NA	NA	NA	NA	NA		\$0	\$0	\$0	\$20,369	\$20,369



Other Critical Metrics

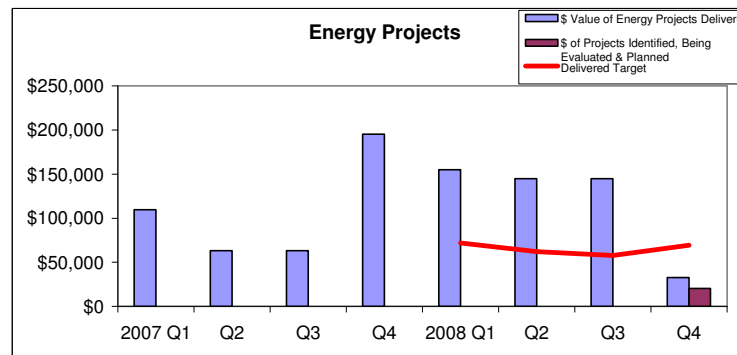
2008 Energy Costs as a Percent of Total Plant Operating Costs	TBD
Potential Savings From Energy Projects Not Yet Completed	\$816,464
Percent Energy Projects Completed	69.26%

Dashboard Color Signals

¹ Green (-4% or more), Yellow (-3.9% - -2%), Red (-1.9% or less)

² Green (85% or more), Yellow (70% - 84%), Red (69% or less)

³ Green (4% or more), Yellow (3.9% - 2%), Red (1.9% or less)



July 20, 2009

3M Plant Dashboard

Energy Trend

Btu/Pound of Product

Change¹

Energy Use (MM Btu)

Change

Energy Cost

Change

Energy Cost per MM Btu

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
23,843	18,761	17,845	18,255	19,617	18,833	18,838	16,593	17,859	21,271	18,510
					-4%	-20.99%	-11.56%	0.08%	16.52%	-5.64%
141,960	114,554	104,194	128,370	489,079	469,515	147,804	120,083	112,512	118,650	499,049
						4.12%	4.83%	7.98%	-7.57%	2.04%
\$1,792,949	\$1,559,032	\$1,441,025	\$1,732,413	\$6,525,420	\$6,264,403	\$1,985,083	\$2,164,435	\$1,996,674	\$1,397,109	\$7,543,300
						10.72%	38.83%	38.56%	-19.35%	15.60%
\$12.63	\$13.61	\$13.83	\$13.50	\$13.34		\$13.43	\$18.02	\$17.75	\$11.78	\$15.12

World Class Rating

Plant Energy Program Effectiveness Rating²

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
90%	90%	90%	90%	90%	85%	87%	87%	92%	92%	92%

Projects

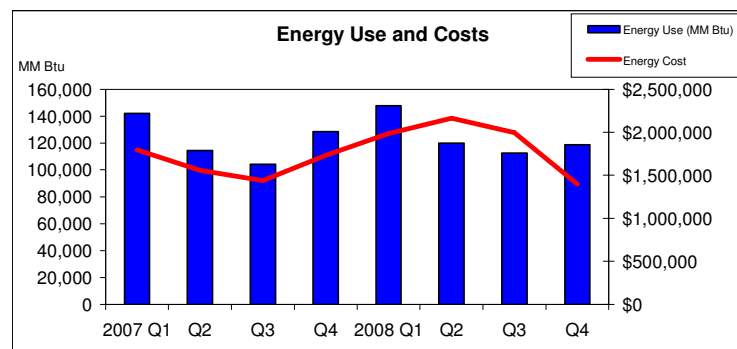
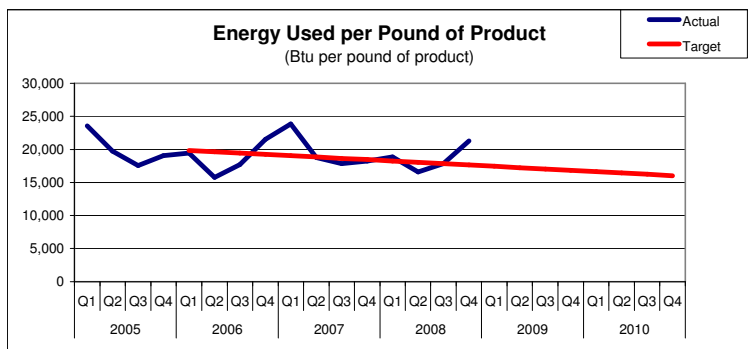
\$ Value of Energy Projects Delivered

\$ Value of Energy Projects Delivered as a %

of Plant Energy Spend³

\$ of Projects Identified, Being Evaluated & Planned

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
\$109,772	\$63,126	\$63,126	\$195,181	\$431,204	\$261,017	\$155,142	\$144,899	\$144,899	\$32,770	\$477,710
6.1%	4.0%	4.4%	11.3%	6.6%	4%	7.8%	6.7%	7.3%	2.3%	7.3%
NA	NA	NA	NA	NA		\$0	\$0	\$0	\$20,369	\$20,369



Other Critical Metrics

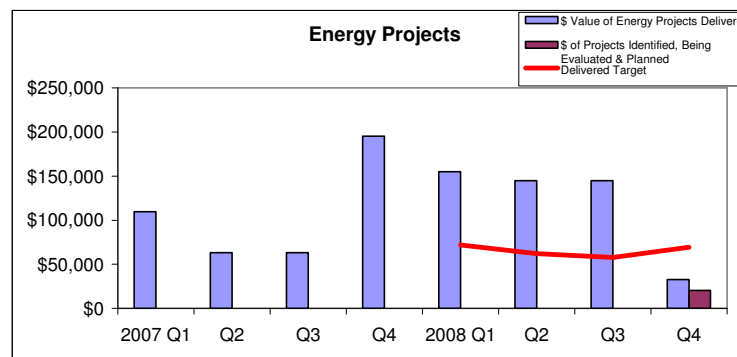
2008 Energy Costs as a Percent of Total Plant Operating Costs	TBD
Potential Savings From Energy Projects Not Yet Completed	\$816,464
Percent Energy Projects Completed	69.26%

Dashboard Color Signals

¹ Green (-4% or more), Yellow (-3.9% - -2%), Red (-1.9% or less)

² Green (85% or more), Yellow (70% - 84%), Red (69% or less)

³ Green (4% or more), Yellow (3.9% - 2%), Red (1.9% or less)



July 20, 2009

3M Plant Dashboard

Energy Trend

Btu/Pound of Product
 Change¹
 Energy Use (MM Btu)
 Change
 Energy Cost
 Change
 Energy Cost per MM Btu

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
23,843	18,761	17,845	18,255	19,617	18,833	18,838	16,593	17,859	21,271	18,510
					-4%	-20.99%	-11.56%	0.08%	16.52%	-5.64%
141,960	114,554	104,194	128,370	489,079	469,515	147,804	120,083	112,512	118,650	499,049
						4.12%	4.83%	7.98%	-7.57%	2.04%
\$1,792,949	\$1,559,032	\$1,441,025	\$1,732,413	\$6,525,420	\$6,264,403	\$1,985,083	\$2,164,435	\$1,996,674	\$1,397,109	\$7,543,300
						10.72%	38.83%	38.56%	-19.35%	15.60%
\$12.63	\$13.61	\$13.83	\$13.50	\$13.34		\$13.43	\$18.02	\$17.75	\$11.78	\$15.12

World Class Rating

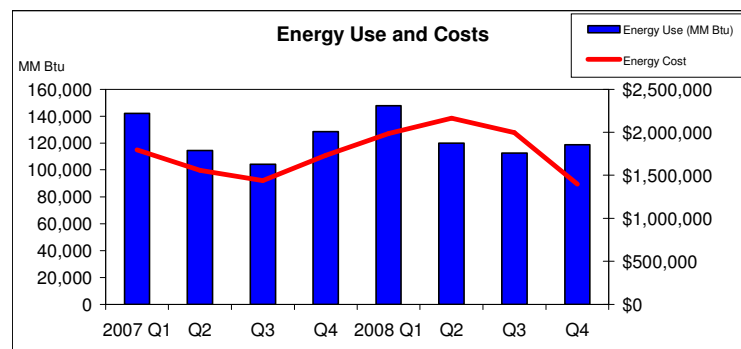
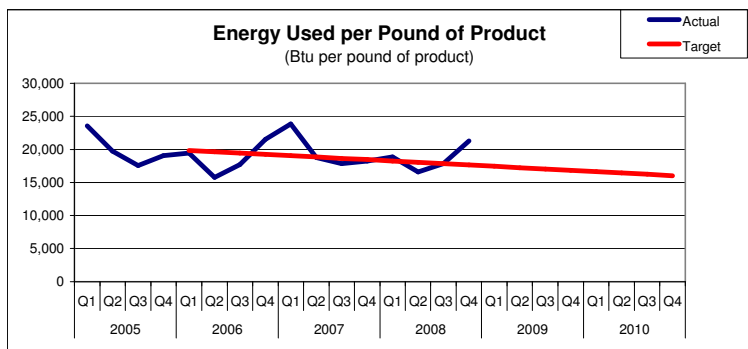
Plant Energy Program Effectiveness Rating²

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
90%	90%	90%	90%	90%	85%	87%	87%	92%	92%	92%

Projects

\$ Value of Energy Projects Delivered
 \$ Value of Energy Projects Delivered as a %
 of Plant Energy Spend³
 \$ of Projects Identified, Being Evaluated & Planned

2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
\$109,772	\$63,126	\$63,126	\$195,181	\$431,204	\$261,017	\$155,142	\$144,899	\$144,899	\$32,770	\$477,710
6.1%	4.0%	4.4%	11.3%	6.6%	4%	7.8%	6.7%	7.3%	2.3%	7.3%
NA	NA	NA	NA	NA		\$0	\$0	\$0	\$20,369	\$20,369

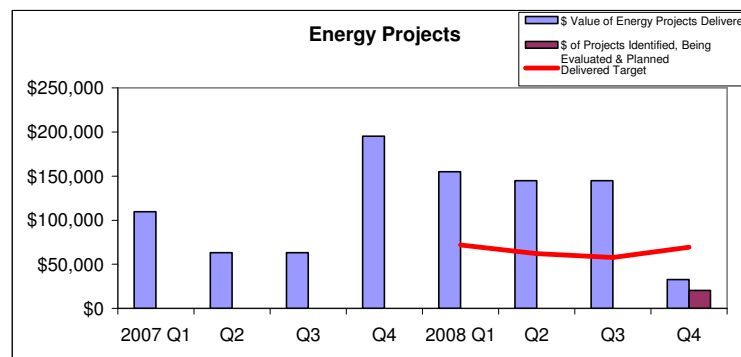


Other Critical Metrics

2008 Energy Costs as a Percent of Total Plant Operating Costs	TBD
Potential Savings From Energy Projects Not Yet Completed	\$816,464
Percent Energy Projects Completed	69.26%

Dashboard Color Signals

¹ Green (-4% or more), Yellow (-3.9% - -2%), Red (-1.9% or less)
² Green (85% or more), Yellow (70% - 84%), Red (69% or less)
³ Green (4% or more), Yellow (3.9% - 2%), Red (1.9% or less)

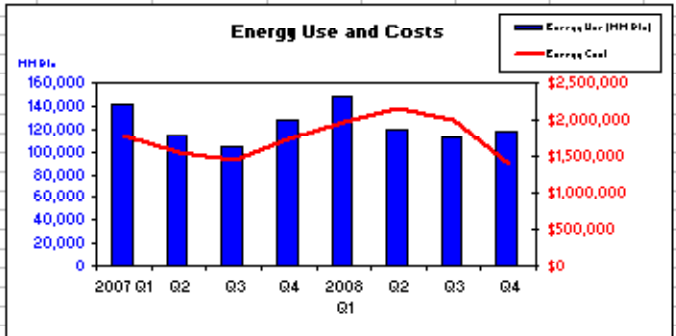
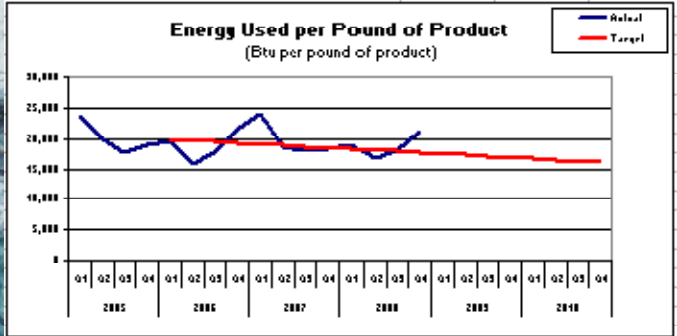


July 20, 2009

3M Plant Dashboard

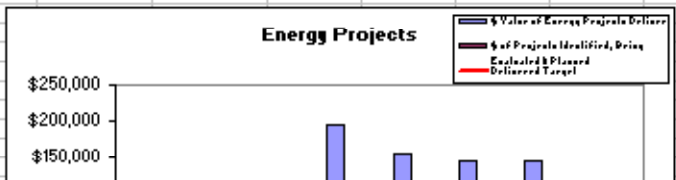
	2007 Q1	Q2	Q3	Q4	2007 Total	2008 Goal	2008 Q1	Q2	Q3	Q4	Total 2008
Energy Trend											
Btu/Pound of Product	23,843	18,761	17,845	18,255	19,617	18,833	18,838	16,593	17,853	21,271	18,510
Change ¹					-4%	-20.33%	-11.56%	0.08%	16.52%	-5.64%	
Energy Use (MM Btu)	141,960	114,554	104,194	128,370	489,079	469,515	147,804	120,083	112,512	118,650	499,049
Change					4.12%	4.83%	7.98%	-7.57%	2.04%		
Energy Cost	\$1,792,949	\$1,559,032	\$1,441,025	\$1,732,413	\$6,525,420	\$6,264,403	\$1,965,063	\$2,164,435	\$1,936,674	\$1,397,109	\$7,543,300
Change					10.72%	38.83%	38.56%	-19.35%	15.60%		
Energy Cost per MM Btu	\$12.63	\$13.61	\$13.83	\$13.50	\$13.34		\$13.43	\$18.02	\$17.75	\$11.78	\$15.12
World Class Rating											
Plant Energy Program Effectiveness Rating ²	90%	90%	90%	90%	90%	85%	87%	87%	92%	92%	92%
Projects											
\$ Value of Energy Projects Delivered	\$109,772	\$63,126	\$63,126	\$195,181	\$431,204	\$261,017	\$155,142	\$144,899	\$144,899	\$32,770	\$477,710
\$ Value of Energy Projects Delivered as a % of Plant Energy Spend ¹	6.1%	4.0%	4.4%	11.3%	6.6%	4%	7.8%	6.7%	7.3%	2.3%	7.3%
\$ of Projects Identified, Being Evaluated & Planned	NA	NA	NA	NA	NA		\$0	\$0	\$0	\$20,363	\$20,363

Award Points	
5	out of 5
5	out of 5
15	Platinum Level Award
Possible Award Levels:	
	Platinum
	Gold
	Silver
	Bronze



Other Critical Metrics

2008 Energy Costs as a Percent of Total Plant Operating Costs	0%
Potential Savings From Energy Projects Not Yet Completed	\$816,464
Percent Energy Projects Completed	63.26%



Concerns – Corporate Level

- Manually reporting energy consumption data
 - Understanding utility bills
- International units of measure
- Validation of information for greenhouse gas inventory
- Confidentiality of data
- Creating quarterly reports
 - Time consuming, but important to maintain visibility and accountability
- Acquisitions and divestitures
- Product level carbon footprint →

- Recognition is key!

Concerns – Plant Level

- Ironic Differentiation of Expenses
 - Stockroom locked with a security camera on the door
 - “All material, including paper towels, must be charged out.”



Concerns – Plant Level

- Ironic Differentiation Accounting Method
 - Stockroom locked with a security camera on the door
 - “All material, including paper towels, must be charged out.”
 - 4” steam lines without meters
 - How will installing meters save me money?





Innovation

